Activity, Behaviour, and Rates of Use of Pacific Salmon Carcasses by Large Vertebrate Scavengers

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ABSTRACT

Shardlow, T.F. 2013. Activity, behaviour, and rates of use of Pacific salmon carcasses by large vertebrate scavengers. Can. Tech. Rep. Fish. Aquat. Sci. 3036: vi + 44 p.

Pacific salmon (*Oncorhynchus* spp.) returning to natal streams exert wide ranging influences on the productivity and integrity of riparian ecosystems. Much of this influence is mediated by scavengers transporting salmon carcasses from stream to forest. Dozens of species of mammals and birds play varying roles in distributing this marine derived nutrient (MDN) and energy resource throughout the riparian zone. In this study salmon carcasses were monitored by motion activated remote cameras to capture large vertebrate scavenging activity, behaviour, as well as rates of salmon consumption and transport. Study results for eight different watersheds in coastal British Columbia indicated that black bears (*Ursus americanus*) exerted both the highest and most consistent influence on salmon carcasses of all the large vertebrates. Diel scavenging patterns by black bears may be associated with cover type with more nocturnal scavenging occurring in open estuaries than in areas of forest cover. Marten (*Martes americana*) and raven (*Corvus corax*) were beneficiaries of bear transported carcasses in some watersheds and ravens were found to selectively scavenge on the head and brain portion of carcasses.

RÉSUMÉ

Shardlow, T.F. 2013. Activity, behaviour, and rates of use of Pacific salmon carcasses by large vertebrate scavengers. Can. Tech. Rep. Fish. Aquat. Sci. 3036: vi + 44 p.

Les saumons du Pacifique (*Oncorhynchus* spp.) qui reviennent à leurs cours d'eau d'origine exercent une influence à grande échelle sur la productivité et l'intégrité des écosystèmes riverains. Cette influence est en grande partie attribuable aux nécrophages qui transportent les carcasses de saumons des cours d'eau à la forêt. Des douzaines d'espèces de mammifères et d'oiseaux jouent divers rôles quant à la distribution de ces éléments nutritifs provenant du milieu marin et de ces sources d'énergie dans les zones riveraines. Aux fins de la présente étude, les carcasses de saumons ont été suivies au moyen de caméras vidéo télécommandées afin d'observer à grande échelle les activités et les comportements des nécrophages vertébrés ainsi que les taux de consommation de saumon et le transport des carcasses. Les résultats de l'étude relativement à huit différents bassins hydrographiques sur la côte de la Colombie-Britannique ont indiqué que les ours noirs (*Ursus americanus*) ont exercé l'influence la plus marquée et la plus constante sur les carcasses de saumons parmi les gros vertébrés. Il a été découvert que les parcours nécrophages journaliers des ours noirs sont associés plus particulièrement au type de peuplement de nécrophages nocturnes dans les estuaires ouverts que dans les zones de couverture forestière. Dans certains bassins hydrographiques, la martre (*Martes americana*) et le corbeau (*Corvus corax*) sont les espèces ayant le plus profité des carcasses transportées par les ours noirs, et il a été démontré que le corbeau préférait la partie comprenant la tête et le cerveau.

1.0 INTRODUCTION

1.1 BACKGROUND

The wide ranging influences on riparian ecosystems resulting from Pacific salmon (*Oncorhynchus* spp.) returning to natal streams have been well documented (see reviews by Willson and Halupka 1995, Willson et al. 1998, Cederholm et al. 1999, Gende et al. 2002, Helfield and Naiman 2006). The marine derived nutrient (MDN) and energy transfers from salmon to aquatic and riparian zone ecosystems (Naiman et al. 2002, Quinn et al. 2009, Levi et al. 2012) are complex and involve many species interacting at various trophic levels (Meehan et al. 2005, Piccolo et al. 2009).

Many vertebrate scavengers (Cederholm et al. 1989, Ben-David et al.1998) receive and redistribute the benefits of MDN from salmon. Carcasses from spawning salmon, that have died or were killed by predators, often remain exposed on the side of the stream or estuary. Some of these carcasses are consumed on-site by scavengers and MDN are redistributed thorough digestive elimination. One half of salmon spawning runs (Quinn et al. 2009) or more (Reimchen 1994), however, can be transported into the forest by black bears (*Ursus americanus*) or brown bears (*Ursus arctos*) (Ruggerone et al. 2000, Quinn et al. 2003). These carcasses are often only partly consumed leaving a substantial amount remaining (Reimchen 2000, Gende et al. 2001, Gende et al. 2004) for a new set of recipient scavengers under the cover of the forest canopy including other bears.

While the list of salmon scavengers in riparian ecosystems is known, there has been little or no systematic sampling to quantify relative use or frequency of scavenging among participant scavengers. Part of the problem is that determining frequency of scavenging of salmon carcasses by visual methods is difficult. Individual carcasses are often partly consumed, scattered widely, scavenged by multiple species, or consumed out of sight. Keeping track of scavenging activities through direct human observation for continuous 24 hour periods is not practical and would yield uncertain results especially since much of the scavenging occurs at night and at a good distance from the observer. In addition there is the unknown influence an observer can have on scavenger's behaviour. Continuous monitoring of carcasses using remote infrared (IR) activated cameras, however, lessens many of these problems.

1.2 OBJECTIVES

This study used remote IR cameras to compare the relative frequency of scavenging bouts, behaviour, and diel activity by large vertebrate scavengers feeding on carcasses in open stream-bank/estuarine areas and on carcasses deposited under forest canopy in the riparian zones of eight Pacific Northwest streams. Estimates of the relative frequency with which large vertebrate scavengers use salmon carcasses are provided as well as estimates of the rates of consumption or transfer of salmon carcasses in the riparian zone by the major vertebrate scavengers.

2.0 METHODS

This study took place between September 2007 and September 2011 in the riparian zone of eight different watersheds in coastal British Columbia (Figure 1). In the south coast, four watersheds on Vancouver Island, Clemens Creek, Upper Nahmint and Lower Nahmint River, and Effingham River, were sampled. In the north-central coast, Chapple Creek and Douglas Creek on Princess Royal Island, Gil Creek on Gil Island, and an unnamed creek on Fin Island were sampled. The watersheds were selected from a previous study of riparian ecosystems conducted by Shardlow and Hyatt (2013).

Salmon carcasses were obtained from nearby hatcheries or were taken from the study stream using tangle nets. The fish were deposited in a loose pile and the total weight was recorded. Salmon species were composed variously of pink (*O. gorbuscha*), coho, (*O. kisutch*), and sockeye (*O. nerka*) depending on the species spawning in the stream. Some carcass deposit sites were located under the cover of the forest canopy (designated "c" following the site number) and were placed from 10 to 20 m from stream banks. Other sites were located a similar distance from the water's edge, but approximately 25 to 100 m from canopy cover (designated "o"). All deposits were made during the fall time period when spawning salmon were present; however, Upper Nahmint River and Fin Island do not have salmon populations.

Scavenger activity was determined using established camera trapping methods (Moruzzi et al. 2002, Swan et al. 2004, O'Connell et al. 2011) and followed the bait station monitoring technique used by Shardlow and Hyatt (2013). The initial total weights of the deposits were noted and the depletion or removal of fish by scavengers was recorded using the infrared activated remote cameras. Continuous 24 hour monitoring over a period of days recorded the species identity, number of feeding bouts, and behaviour of the scavengers. Fish depletion rates were estimated volumetrically from sequential camera images bearing date and time notations. For some trials at Chapple Creek, salmon were placed singly at the stream side to record detailed scavenging behaviour such as time to discover and body parts eaten.

The time of day and duration of each scavenger feeding bout was recorded, however individuals within a species could not be identified. A time interval of 5 minutes with no scavengers recorded on camera was arbitrarily used to delineate between feeding bouts. Periods of daylight and darkness were determined using official records and from the camera images. Consumption rates were estimated up to the point where 95% of the carcass deposit had been depleted. This was because scavengers, particularly bears and marten (*Martes americana*), would continue to visit the site, sometimes for many days, after only small fragments remained or the carcasses were completely gone.

3.0 RESULTS

Data from all scavenging bouts are provided in the appendix 1 and 2 giving bout duration, number of individuals, and estimates of the proportion of carcasses remaining over time. A summary of the list of scavengers recorded and the number of feeding bouts are presented in Table 1. The highest incidence of feeding bouts at carcass sites were those undertaken by black bears with a total 286 feeding bouts recorded for all sites combined. Marten were second among mammals recording 75 bouts with mink

(*Neovison vison*), squirrel (*Tamiasciurus douglasii*), raccoon (*Procyon lotor*), and ermine (*Mustela erminea*) feeding bouts occurring rarely. Crows (*Corvus caurinus*) and ravens (*Corvus corax*) dominated the feeding bouts for birds with 167 and 158 bouts respectively. Gulls (*Larus spp.*) were frequent (74 bouts), Bald eagles (*Haliaeetus leucocephalus*) less so (19 bouts) and Steller's jay (*Cyanocitta stelleri*) rare (3 bouts).

Consumption or removal rates and the number of feeding bouts by species and trial deposit site are shown in Table 2. Two trials (Clemens Creek 1c and Upper Nahmint River 1c) were monitored for 65 days and 18 days respectively prior to depositing fish. During this time six black bears visits were recorded at Clemens Creek 1c and no scavengers visited Upper Nahmint 1c. The average removal rate of fish by scavengers for all trials on Vancouver Island was 0.52 kilograms per hour (kg/h) and 0.24 kg/h for Princess Royal Island and area. Removal rates varied from a low of 0.16 kg/h at Upper Nahmint 2c where only one marten visited the site and the fish were consumed by insects. The highest rate of use was 1.27 kg/h at Effingham River trial 3. This trial also recorded the most feeding bouts by black bears (41) and crows (63).

Black bear at a carcass deposit site at Effingham River.

3.1 BLACK BEARS

Scavenging by black bear occurred consistently across sample sites and trials in all watersheds that contained spawning salmon with Gil Creek being the only exception. Black bears were also responsible for the majority of carcass removal and depletion at deposit sites. ($R^2 = .74$, $P = 3.1E\text{-}05$, Figure 2).

Black bears scavenged continuously over the diel period with peaks just before dawn and after dusk (Figure 3). Nocturnal scavenging bouts (Table 3) amounted to 54% (95% CI ± 4%,) of all observations in trials that were located under the forest canopy ("c"). However, for trials located in estuarine areas with no canopy cover, ("o") nocturnal scavenging was significantly higher at 71% (χ^2, $P = .01$)

Scavenging behaviour was classified primarily by bout duration and sometimes modified by information recorded on the camera images. Black bears approached the

carcasses singly except in a few cases where a cub accompanied a sow. In 80% of the bouts fish were removed from the site presumably to be consumed elsewhere (Table 4). Many bouts (37%) were classified as "snatch and run" lasting for less than 30 sec. In 43% of the cases, individual bears took from 1 to 5 minutes to select a carcass for removal. Finally in 20% of the scavenging bouts individual bears consumed carcasses on site with feeding lasting from 5 to 49 min.

3.2 MARTEN

Salmon scavenging by marten was localized to two watersheds and four of the 11 deposit trials on Vancouver Island and was completely absent on Princess Royal Island and area (Table 2.) Marten scavenged as single individuals with bouts lasting 1.0 minute or less. They were not reluctant to scavenge when whole carcasses were available at the beginning of the trials and two individuals were observed removing a whole sockeye larger then themselves. Scavenging forays were mostly nocturnal (75% of bouts, χ^2, $P = .0003$) and were observed only in sites with a covered canopy (Table 3).

Marten at Nahmint River searching for scraps under the forest canopy

3.3 RAVEN

Ravens were recorded at just one trial on Vancouver Island (Upper Nahmint 3c), but were found at all sites and trials on Princess Royal Island and area. They were more active in areas with canopy cover than at the open sites. Ravens scavenged as individuals for the majority of bouts (84%, n = 107) but also scavenged in groups of two or three with a maximum of five individuals recorded on the carcasses at one time. During three trials (Upper Nahmint 3c, Gil Creek 1c, and Fin Island 1c) no bears attended and ravens were the major scavengers recorded. At these trials carcass removal rates were 0.18, 0.23, and 0.20 kg/h respectively (Table 2). Ravens appeared to stay on the carcasses until satiated with an average feeding bout of 2.6 min. Only during a few of the bouts (18%, n = 70) did they snatch and run, i.e., spend less than 30 seconds at the carcass.

At Chapple Creek, where pink salmon were placed on the stream bank as individual fish, ravens were the first scavengers to discover these carcasses in ten of the 11 trials

(Table 5) and in all scavenging bouts the head (brain area) was eaten exclusively or first. In eight of the 11 trials black bears removed the remainder of the carcass.

Raven at Chapple Creek eating the eye and brain areas of a salmon carcass

3.4 CROWS AND GULLS

Gulls and crows tended to scavenge together and were recorded scavenging only in areas with no canopy cover at all trials located in the Lower Nahmint and Effingham Rivers (Table 2). Although gulls and crows were observed in the study area in the Princess Royal Island and area, none approached the carcass sites.

Crows at Effingham River cleaning up leftovers after carcasses were removed by bears

4.0 DISCUSSION

4.1 BLACK BEARS

Monitoring scavenging bouts showed that black bears were both the most frequent and consistent of all the salmon scavengers found in the eight different watersheds during the 15 monitored trials (see Tables 1 and 2). Moreover, the removal rate of carcasses placed on the open streamside or under forest cover was primarily influenced by the number of bear scavenging bouts (Figure 2). None of the other scavenger species found in this study were consistent between watersheds and were often absent from scavenging activity altogether. Scavenging behaviour at the carcass sites in this study (Table 4) was similar to that found by (Reimchen 1994, Gende and Quinn 2004) where bears carried the majority of carcasses to a different location (stream to forest) presumably to avoid antagonistic interactions with other bears. All of the single carcass deposits presented in Table 5 were carried away from their placement on the stream bank when scavenged by bears. In addition, when carcasses were deposited in the forest, bears were the main agent responsible for further carcass movement. These results and those of Shardlow and Hyatt (2013), show black bears as the only large vertebrate with a strong temporal and spatial association with salmon.

Diel feeding patterns found in this study were similar to those found by others (Frame 1974, Bridges et al. 2004) where peak activity occurred near sunrise and sunset (Figure 3). However, diel patterns have been found vary in other studies. MacHutchon et al. (1998) found that black bears, traversing forest bear trials near the Nimpkish River on Vancouver Island, were more active in the day than at night. On the other hand, Reimchen (1998) using night vision goggles on Moresby Island, BC reported primarily nocturnal salmon feeding in the estuary. This study similarly found black bears tended toward nocturnal scavenging in estuarine sites but were equally active night and day when under forest cover (Table 3). These results coupled with the findings of the two studies above, suggest that variations in diel scavenging activity may be influenced by cover type.

Black bears scavenged as single individuals and they removed fish in 80% of the bouts. Table 2 shows 430 kg fish total removed during 175 (i.e. 219 total bouts x 80%). This calculates to 2.5 kg removed per bear visit which is about equal to one salmon removed per bear scavenging bout.

4.2 MARTEN

Marten scavenging activity was not consistent across watersheds but was concentrated in one trial site at Clemens Creek. This is despite the fact that this species was recorded by camera captures in all of the study watersheds on Vancouver Island (Shardlow and Hyatt 2013). Ben-David et al. (1997) showed that marten will sometimes pass up salmon completely and tend to scavenge on salmon only when rodent populations are low. In this study, marten scavenged exclusively in cover of the forest canopy and never in open sites (Table 2). This result is in keeping with their tendency to avoid areas with low cover (Potvin et al. 2001, Smith and Schafer 2002). At one site, Clemens Creek

on Vancouver Island, this scavenger was found to be the main beneficiary of carcasses relocated from the stream to the forest by black bears.

4.3 RAVEN

Raven scavenging was very localized and occurred primarily in sites under canopy cover. When bears were absent, ravens tended to replace them as the primary salmon scavenger (Table 2) (t test. $P = .10$). Of particular interest is the pattern of carcass feeding by ravens. At most trial sites where ravens and bears were co-existent, ravens were the first to discover and feed on the carcasses. At Chapple Creek ravens were the first scavenger to discover and consume the head of the streamside carcasses. Starting with the eyes of the salmon, ravens eventually consumed the brain and head area (Table 5). Other studies have attributed head eating exclusively to bears (Reimchen 1994) or grey wolves (*Canis lupus*) (Darimont et al. 2003) and used the occurrence of head eaten salmon carcasses as diagnostic of these scavengers activity. Although wolves were observed at Chapple Creek, they were not observed scavenging salmon. Black bears at Chapple Creek carried off carcasses after ravens had consumed the head area. Given the ubiquitous distribution of ravens and their ability to quickly locate carcasses, it seems unlikely that all head eaten carcasses, as suggested in past studies, can be exclusively the result of either wolf or bear scavenging.

4.4 OTHER AVIAN SCAVENGERS

The reason crows were found to scavenge only in the estuarine areas of the Vancouver Island sites but not in the Princess Royal Island area is not clear. Both areas had the same species (*Corvus caurinus*) and large flocks of crows were observed in Chapple Inlet. Similarly, Bald eagles were observed in most watersheds both on Vancouver Island and Princess Royal area, but scavenged only occasionally at the carcass sites. Eagles at Gil Creek, Chapple Creek, and Douglas Creek in the Princess Royal area were observed preying on live salmon spawning in shallow areas. One might speculate that in these cases, eagles preferred live salmon over carcasses. Although gulls can be major consumers of salmon carcasses and can occur in scavenging flocks numbering in the thousands (Christie and Reimchen 2005), they were not found in large numbers in this study. The gulls observed in Princess Royal Island and area were Bonaparte's gulls (*Chroicocephalus philadelphia*) and Mew gulls (*L. canus*) who mainly dip for salmon eggs and do not scavenge carcasses (Willson 2004) while the glaucous-winged (*L. glaucescens*) and Thayer's gulls (*L. thayeri)* found at the Vancouver Island sites are frequent scavengers of salmon.

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7.0 FIGURES

Figure 1. Location of carcass trial sites on Vancouver and Princess Royal Islands.

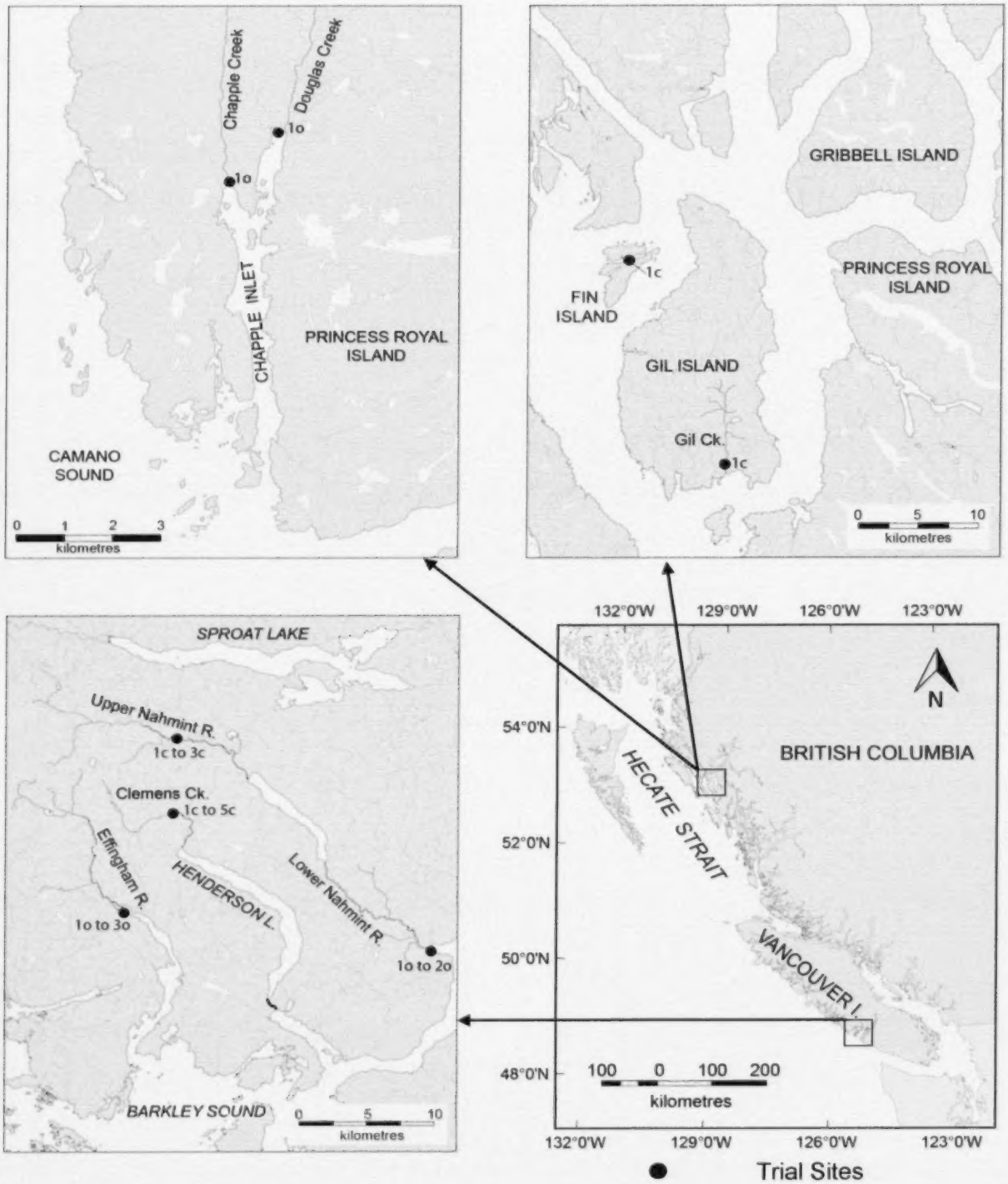


Figure 2. Relationship between the kg of salmon carcases removed and number of black bear feeding bouts recorded via remote camera at carcass deposit sites.

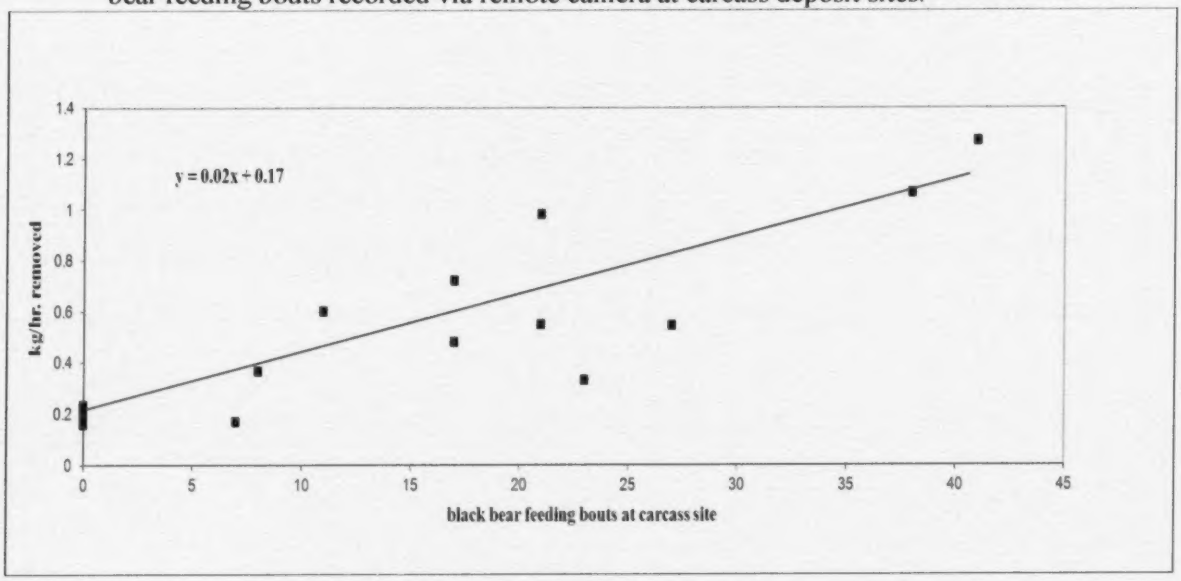
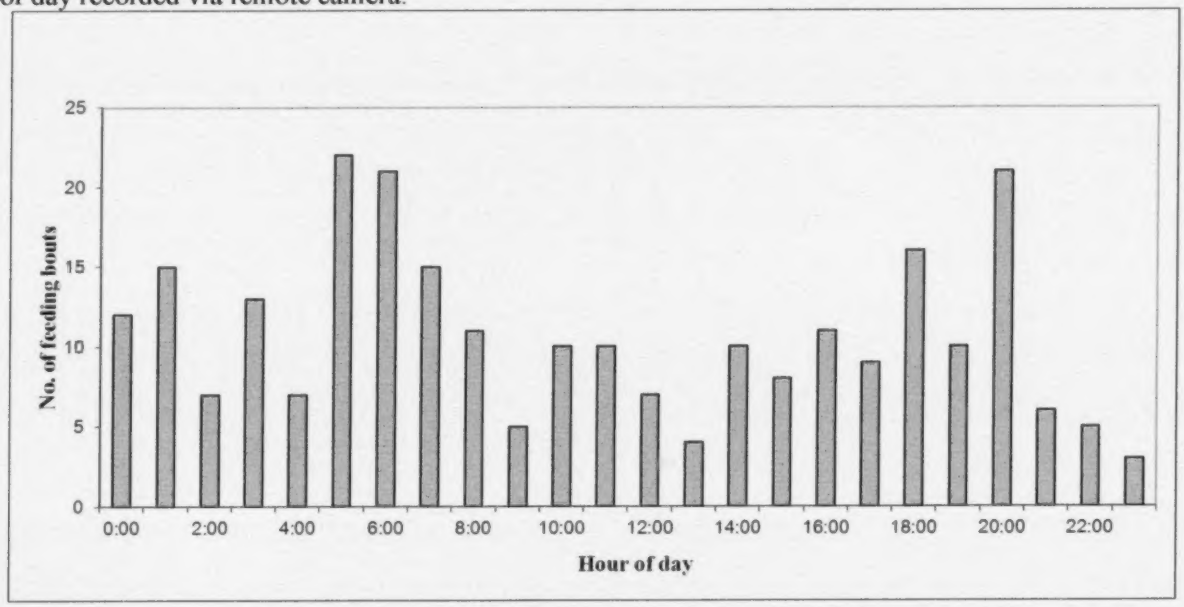


Figure 3. Frequency of black bear feeding bouts at salmon carcass deposit sites by hour of day recorded via remote camera.



8.0 TABLES

Table 1. Mammals and birds captured during scavenging bouts at salmon carcass deposits in the riparian zone of Vancouver Island and Princess Royal Island streams

Mammals	Species captured on camera	Number of bouts
Black bear	*Ursus americanus*	286
Marten	*Martes americana*	75
Mink	*Neovison vison*	2
Douglas squirrel	*Tamiasciuris douglasii*	1
Raccoon	*Procyon lotor*	1
Ermine	*Mustela erminea*	1
Birds		
Raven	*Corvus corax*	158
Crow	*Corvus caurinus*	167
Gull	*Larus spp.*	74
Bald eagle	*Haliaeetus leucocephalus*	19
Steller's jay	*Cyanocitta stelleri*	3

Table 2. Consumption rates by most common species scavenging on salmon carcass deposits in riparian zones.

Watershed/ location	Trial No. cover[1] type	Deposit month-year	Kg. fish	Hrs to 95% consumed	Removal rate (kg/hr)	Scavenging bouts recorded					
						bear	marten	raven	eagle	crow	gull
Vancouver Island											
Clemens Cr.	1c	Sep-07	0	1512[2]		6	0	0	0	0	0
	2c	Nov-07	38	70	0.54	27	0	0	0	0	0
	3c	Sep-08	34	32	1.06	38	6	3	0	0	0
	4c	Nov-08	43	44	0.98	21	16	0	9	0	0
	5c	Oct-08	36	50	0.72	17	23	0	0	0	0
Upper Nahmint	1c	Sep-08	0	474[2]		0	0	0	0	0	0
	2c	Sep-08	43	288[3]	0.16	0	1	0	0	0	0
	3c	Oct-08	43	238	0.18	0	7	80	0	0	0
Lower Nahmint	1o	Oct-09	45	94	0.48	17	0	0	0	40	9
	2o	Nov-09	34	93	0.37	8	0	0	0	41	16
Effingham R.	1o	Oct-09	42	77	0.55	21	0	0	0	1	34
	2o	Nov-09	34	103	0.33	23	0	0	0	21	9
	3	Nov-09	38	30	1.27	41	0	0	0	63	6
Totals			430	831	0.52	219	53	83	9	166	74
Princess Royal Island and area											
Chapple Cr.	1o	Sep-11	15	25	0.60	11	0	1	0	0	0
Douglas Cr.	1o	Sep-11	15	89	0.17	7	0	1	0	0	0
Gil Cr	1c	Aug-10	7	30	0.23	0	0	23	4	0	0
Fin Island	1c	Sep-10	9	45	0.20	0	0	12	0	0	0
Totals			46	189	0.24	18	0	37	4	0	0

1 Cover type: c = canopy, o = open

2 total hours monitored

3 Carcass consumed primarily by insects

Table 3
Chronotypical behaviour of salmon scavengers by watershed
recorded by camera captures at carcass deposit sites in open and covered canopy .

		Black bear		Pine marten	
Watershed	Trial No. cover type	Number of bouts	Proportion at night	Number of bouts	Proportion at night
Clemens Cr.	2c	27	0.48	0	
	3c	42	0.67	4	0.50
	5c	26	0.42	40	0.80
	4c	29	0.58	13	0.69
	Avg		0.54		0.75
Effingham R.	1o	17	0.82	0	
	2o	21	0.62	0	
Lower Nahmint R.	1o	15	0.73	0	
	2o	8	0.63	0	
Chapple Cr.	1o	10	0.70	0	
Douglas Cr.	1o	7	0.71	0	
	Avg		0.71		

Table 4.
Behaviour of black bears scavenging at carcass sites.

Watershed/ location	Snatch and run	Select and remove	Consume on site
Clemens Cr.	44	47	18
Lower Nahmint	15	7	3
Effingham R.	12	34	24
Chapple Cr.	7	4	0
Douglas Cr.	3	3	0
Total	81	95	45
%	37	43	20

Table 5.
Hours to discovery and parts eaten of pink salmon carcasses placed singley on the bank of Chapple Creek

	Raven		Bear	
Trial #	Hours to discovery	part eaten	time to discovery	part eaten
1	0.03	head	32	remainder
2	1.2	whole		
3	7	head	10.5	remainder
4	9	head	23.5	remainder
5	0.25	head	23.4	remainder
6	0.5	head	23	remainder
7	4.16	head	10.25	remainder
8			29	whole
9	5	head		
10	0.35	head	3	remainder
11	3.2	head	5	remainder
Avg.	3.1		17.7	

9.0 APPENDIX 1

Table 1 Scavenger activity at fish carcass sites

Location: Clemens Creek
Deposit Time & Date: Sep 4, 2007,
Kg deposited no bait

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Sep-06	14:00	n/a	deer	1	n/a
Sep-12	9:29	n/a	deer	1	n/a
Sep-15	10:05	n/a	deer	1	n/a
Sep-27	11:13	n/a	deer	1	n/a
Oct-01	22:04	n/a	deer	1	n/a
Oct-03	19:05	n/a	deer	1	n/a
Oct-05	9:00	n/a	black bear	1	n/a
Oct-08	1:17	n/a	black bear	1	n/a
Oct-15	12:34	n/a	black bear	1	n/a
Oct-19	18:43	n/a	deer	1	n/a
Oct-20	9:46	n/a	deer	1	n/a
Oct-22	20:28	n/a	black bear	1	n/a
Oct-23	18:35	n/a	black bear	1	n/a
Oct-24	0:11	n/a	black bear	1	n/a
Nov-07	remove camera				

Table 2. Scavenger activity at fish carcass sites

Location: Clemens Creek
Deposit Time & Date: 16:53, Nov 7, 2007,
Kg deposited 40

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
08-Nov	19:28	1	black bear	1	100
09-Nov	3:05	≤ 1	black bear	1	
	3:38	1	black bear	1	90
	6:22	≤ 1	black bear	1	
	6:27	30	black bear	1	70
	10:06	1	black bear	1	
	14:21	1	black bear	1	
	14:42	1	black bear	1	50
	14:44	10	black bear	1	
	17:08	2	black bear	1	20
	17:20	1	black bear	1	
	21:28	≤ 1	black bear	1	
	22:09	3	black bear	1	10
	22:26	≤ 1	black bear	1	
10-Nov	1:28	1	black bear	1	
	1:57	1	black bear	1	
	2:02	1	black bear	1	
	5:24	6	black bear	1	
	14:08	4	black bear	1	5
	15:05	6	black bear	1	1
	15:22	2	black bear	1	
12-Nov	13:12	14	black bear	1	
	16:32	8	black bear	1	
	16:43	1	black bear	1	
	18:13	≤ 1	bald eagle		
13-Nov	6:38	5	black bear	1	0
	15:10	2	deer	1	0
	18:20	≤ 1	black bear	1	0

Table 3.
Scavenger activity at fish carcass sites

Location: Clemens Creek
Deposit Time & Date: 16:43, Sep 28, 2008,
Kg deposited 36

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
28-Sep	19:58	2.0	black bear	1	100
	20:27	0.5	black bear	1	
	20:30	1.0	black bear	1	
	20:41	0.5	black bear	1	
	15:28	1.0	black bear	1	
	23:32	0.5	black bear	1	
	23:40	0.5	black bear	1	
	23:49	0.5	black bear	1	
29-Sep	0:01	0.5	black bear	1	90
	0:36	2.0	black bear	1	
	0:49	0.5	black bear	1	
	3:17	0.5	black bear	1	
	3:29	0.5	black bear	1	
	3:35	0.5	black bear	1	
	3:42	0.5	black bear	1	
	3:53	0.5	black bear	1	
	4:14	3.0	black bear	1	
	5:36	2.0	black bear	1	
	5:43	4.0	black bear	1	
	6:00	0.5	black bear	1	
	7:03	0.5	black bear	1	80
	7:27	0.5	black bear	1	
	9:25	1.0	black bear	1	
	9:36	1.0	black bear	1	
	9:46	1.0	black bear	1	
	9:55	4.0	black bear	1	
	17:45	0.5	black bear	1	50
	18:09	0.5	black bear	1	
	18:21	8.0	black bear	1	
	18:36	0.5	black bear	1	20

Table 3. continued

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
	18:40	1.0	black bear	1	
	19:11	0.5	black bear	1	
	19:17	0.5	black bear	1	
	21:48	0.5	black bear	1	10
	22:04	0.5	black bear	1	
	22:08	2.0	black bear	1	
	22:35	1.0	black bear	1	
30-Sep	0:21	0.5	black bear	1	5
	7:15	5.0	black bear	1	2
	7:57	1.0	raven	1	
	8:13	0.5	raven	1	
	8:57	0.5	raven	1	
	10:13	0.5	marten	1	
	10:41	0.5	marten	1	
	18:45	3.0	black bear	1	
	20:43	8.0	black bear	1	
	21:24	0.5	marten	1	
	21:36	0.5	marten	1	
	21:45	0.5	black bear	1	0
01-Oct	3:31	0.5	black bear	1	
02-Oct	21:17	0.5	marten	1	
05-Oct	21:38	0.5	marten	1	
09-Oct	8:16	0.5	deer	1	

Table 4. Scavenger activity at fish carcass sites

Location: Clemens Creek
Deposit Time & Date: 16:15, Oct 15, 2008,
Kg deposited 38

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
15-Oct	19:26	≤ 1	marten	1	100
	20:08	≤ 1	marten	1	
	20:29	≤ 1	marten	1	
	21:20	1.0	marten	1	
	21:34	1.0	marten	1	
16-Oct	1:33	1.0	marten	1	
	2:40	1.0	marten	1	
	5:30	≤ 1	marten	1	
	6:20	11.0	black bear	1	
	6:37	1.0	black bear	1	
	7:52	2.0	black bear	1	
	11:00	≤ 1	marten	1	
	14:20	≤ 1	black bear	1	
	16:03	≤ 1	marten	1	
	16:37	19.0	black bear	1	90
	19:37	≤ 1	marten	1	
	19:41	≤ 1	marten	1	
	19:44	≤ 1	marten	1	
	19:56	≤ 1	marten	1	
	20:37	≤ 1	marten	1	
	20:40	≤ 1	marten	1	
	22:04	≤ 1	black bear	1	75
17-Oct	0:02	≤ 1	marten	1	
	0:11	≤ 1	marten	1	
	0:17	≤ 1	marten	1	
	0:59	≤ 1	black bear	1	
	8:30	≤ 1	black bear	1	
	8:45	≤ 1	black bear	1	
	9:04	≤ 1	black bear	1	50
	10:44	2.0	black bear	1	

Table 4. Continued

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
	11:25	2.0	black bear	1	
	12:28	≤ 1	black bear	1	
	13:19	≤ 1	marten	1	
	13:44	1.0	black bear	1	
	14:34	1.0	black bear	1	25
	14:39	1.0	black bear	1	
	15:39	≤ 1	marten	1	
	17:04	≤ 1	black bear	1	
	17:36	≤ 1	marten	1	10
	18:02	≤ 1	marten	1	
	18:20	2.0	black bear	1	
	20:47	1.0	black bear	1	1
	21:47	1.0	black bear	1	0
	22:50	≤ 1	black bear	1	
	21:06	≤ 1	marten	1	
	21:12	≤ 1	marten	1	
18-Oct	1:03	1.0	marten	1	
	1:24	≤ 1	marten	1	
	1:55	1.0	marten	1	
	3:28	6.0	black bear	1	
	4:09	≤ 1	marten	1	
	4:17	≤ 1	marten	1	
	5:24	≤ 1	marten	1	
	5:30	1.0	marten	1	
	6:44	2.0	marten	1	
	12:56	1.0	black bear	1	
	19:36	2.0	marten	1	
	20:15	≤ 1	marten	1	
19-Oct	1:14	≤ 1	black bear	1	
	1:21	≤ 1	marten	1	
	5:01	≤ 1	marten	1	
	14:05	≤ 1	marten	1	
	21:05	≤ 1	marten	1	
	21:44	≤ 1	marten	1	

Table 4. Continued

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
21-Oct	3:37	≤ 1	marten	1	
	13:15	≤ 1	hawk	1	
	17:51	≤ 1	marten	1	
	19:06	≤ 1	marten	1	
22-Oct	5:24	≤ 1	black bear	1	
	20:01	≤ 1	marten	1	
24-Oct	10:37	≤ 1	black bear	1	
30-Oct	0:26	≤ 1	marten	1	
31-Oct	5:43	≤ 1	black bear	1	

Table 5. Scavenger activity at fish carcass sites

Location: Clemens Creek
Deposit Time & Date: 11:09, Nov 4, 2008,
Kg deposited 45

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
04-Nov	20:17	≤ 1	marten	1	100
05-Nov	1:10	2.0	marten	1	
	2:28	4.0	black bear	1	
	4:24	1.0	marten	1	
	11:55	3.0	black bear	1	
	12:03	≤ 1	black bear	1	
	16:50	≤ 1	black bear	1	
	17:03	10.0	black bear	1	
	17:16	≤ 1	marten	1	
	17:20	≤ 1	marten	1	
	20:16	22.0	black bear	1	
	22:11	1.0	black bear	1	50
	22:20	1.0	black bear	1	
06-Nov	1:01	3.0	black bear	1	
	1:11	1.0	black bear	1	
	1:16	17.0	black bear	1	
	2:50	12.0	black bear	1	25
	3:18	7.0	black bear	1	
	4:51	12.0	black bear	1	
	5:13	7.0	black bear	1	
	5:28	≤ 1	black bear	1	10
	5:42	≤ 1	marten	1	
	7:36	≤ 1	black bear	1	
	7:47	4.0	black bear	1	
	8:04	≤ 1	black bear	1	5
	10:02	49.0	black bear	1	
	14:09	1.0	black bear	1	
	15:45	2.0	black bear	1	
	15:58	≤ 1	black bear	1	
	16:07	≤ 1	black bear	1	

Table 5 Continued

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
	16:36	≤ 1	marten	1	
	17:57	≤ 1	bald eagle	1	
	19:22	≤ 1	marten	1	
	19:52	≤ 1	black bear	1	
07-Nov	2:58	1.0	marten	1	
	5:23	≤ 1	marten	1	
	5:26	≤ 1	marten	1	
	5:55	≤ 1	marten	1	
	7:26	≤ 1	marten	1	
	8:26	5.0	bald eagle	2	
	8:43	1.0	bald eagle	1	
	12:23	1.0	bald eagle	1	
	16:10	≤ 1	black bear	1	
	17:26	1.0	bald eagle	1	
	17:06	1.0	black bear	1	
	17:48	≤ 1	marten	1	
10-Nov	15:32	≤ 1	bald eagle	1	
	15:55	≤ 1	bald eagle	1	
	16:06	≤ 1	bald eagle	1	
17-Nov	6:15	16.0	black bear	1	
	15:24	≤ 1	black bear	1	
18-Nov	1:49	≤ 1	marten	1	
	20:23	≤ 1	marten	1	
20-Nov	2:35	≤ 1	racoon	1	
24-Nov	7:08	≤ 1	marten	1	1

Table 6. Scavenger activity at fish carcass sites

Location: Upper Nahmint River
Deposit Time & Date: 13:30, Sep 3, 2008,
Kg deposited None

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Sep-04	16:51	≤ 1	deer	1	n/a
Sep-13	2:14	≤ 1	elk	1	n/a
Sep-14	6:54	≤ 1	deer	1	n/a
	6:57	≤ 1	deer	1	n/a
Sep-16	20:48	1	elk	1	n/a
Sep-21	9:30	≤ 1	deer	1	n/a
	18:30	7	deer	1	n/a

Table 7. Scavenger activity at fish carcass sites

Location: Upper Nahmint River
Deposit Time & Date: 12:45, Sep 28, 2008,
Kg deposited 45

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Oct-07	15:15:00	≤ 1	marten	1	0
Oct-08	:30	1	black bear	1	0
	:59	2	black bear	1	0

Note: all carcasses consumed by flies

Table 8. Scavenger activity at fish carcass sites

Location: Upper Nahmint River
Deposit Time & Date: 11:56, Oct 14, 2008,
Kg deposited 45

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Oct-15	00:37:00	≤ 1	marten	1	100
	8:31	≤ 1	raven	1	
	8:38	1	raven	1	
	9:02	6	raven	2	
	9:13	4	raven	2	
	9:22	1	raven	2	
	9:36	1	raven	1	
	9:41	2	raven	2	
	9:53	1	raven	1	
	10:01	1	raven	1	
	10:23	1	raven	1	
	10:27	1	raven	1	
	11:00	≤ 1	raven	1	
	11:14	≤ 1	raven	1	
	11:34	≤ 1	raven	1	
	11:39	≤ 1	raven	1	
	14:04	7	raven	1	
	14:18	7	raven	1	
	14:30	1	raven	1	
	14:36	2	raven	1	
	14:44	2	raven	1	
	14:50	1	raven	1	
	14:57	1	raven	1	
	15:01	2	raven	1	
	15:23	2	raven	1	
	15:51	1	raven	1	
	16:33	1	raven	1	

Table 8. Continued

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
	16:49	≤ 1	raven	1	
	17:02	1	raven	1	
Oct-16	14:09	1	raven	1	
Oct-17	10:38	1	raven	1	
	12:44	1	raven	1	
Oct-18	3:19	1	marten	1	
	8:17	≤ 1	raven	1	50
	15:31	≤ 1	raven	1	
	11:20	19	raven	2	
	11:46	1	raven	1	
	11:58	4	raven	1	
	13:09	1	raven	1	
	13:17	≤ 1	raven	1	30
	13:26	6	raven	1	
	20:19	≤ 1	marten	1	
Oct-21	8:14	≤ 1	raven	1	
	8:20	≤ 1	raven	1	
	8:26	5	raven	1	
	8:54	≤ 1	raven	1	
	9:36	3	raven	1	
	9:41	1	raven	1	
	13:27	1	raven	1	
	13:37	1	raven	1	
Oct-22	15:59	15	raven	2	
	16:39	1	raven	1	
Oct-23	8:16	9	raven	2	
	8:31	5	raven	2	
	8:56	2	raven	1	
	9:01	1	raven	1	
	9:06	1	raven	1	

Table 8. Continued

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
	16:07	1	raven	1	
	16:17	4	raven	1	
Oct-19	10:19	7	raven	2	
	10:33	1	raven	1	
	10:36	1	raven	1	
	10:43	1	raven	1	
	9:11	≤ 1	raven	1	
	9:32	1	raven	1	
	9:37	1	raven	1	
	14:15	15	raven	2	
Oct-24	9:18	2	raven	1	
	20:31	≤ 1	ermine	1	
Oct-25	10:23	2	raven	1	
	10:28	1	raven	1	
	10:35	9	raven	2	
	10:47	1	raven	1	
	10:52	1	raven	1	
Oct-26	21:15	1	marten	1	
	21:21	≤ 1	marten	1	
Oct-27	3:36	≤ 1	marten	1	
	3:51	4	marten	1	1

Table 9. Scavenger activity at fish carcass sites

Location: Nahmint Estuary
Deposit Time & Date: 11:48, October 15, 2009,
Kg deposited 47

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Oct-16	15:35	≤ 1	black bear	1	100
Oct-17	0:18	≤ 1	black bear	1	
	0:51	≤ 1	black bear	1	
	1:01	≤ 1	black bear	1	
	5:31	20	black bear	2	
	5:58	7	black bear	2	
	16:36	≤ 1	black bear	1	
	16:44	4	black bear	1	
	20:32	≤ 1	black bear	1	
Oct-18	1:10	≤ 1	black bear	1	
	2:22	≤ 1	black bear	1	
	2:49	≤ 1	black bear	1	
	9:24	≤ 1	crow	1	
	14:06	2	crow	2	
	14:57	≤ 1	crow	4	
	15:09	≤ 1	crow	1	
	15:35	≤ 1	crow	1	
	15:54	6	crow	5	
	15:59	4	gull	4	
	16:11	≤ 1	crow	5	
	16:18	≤ 1	crow	5	
	16:26	≤ 1	crow+gull	2	
	18:29	≤ 1	black bear	1	
	23:01	≤ 1	black bear	1	
	23:23	≤ 1	black bear	1	

Table 9. Continued

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
	23:52	≤ 1	black bear	1	
Oct-19	5:28	≤ 1	black bear	1	
	7:03	2	crow	4	
	7:05	≤ 1	gull	2	
	7:21	6	crow+gull	4	
	8:32	6	crow	1	
	9:00	10	crow	5	
	9:39	4	crow+gull	5	
	9:44	7	crow	4	5

Table 10. Scavenger activity at fish carcass sites

Location: Nahmint Estuary
Deposit Time & Date: 9:59, November 1, 2009,
Kg deposited 47

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Nov-02	22:40	1	black bear	1	100
Nov-03	5:57	≤ 1	black bear	2[1]	
	6:10	1	black bear	1	
	6:58	45	black bear	2[1]	
	8:53	1	crow	1	
	9:02	52	crow	9	
	9:41	≤ 1	crow	1	
	10:28	1	crow	1	
	15:08	7	crow	5	
	15:22	2	crow & gull	4+1	
	15:30	27	cros	7	
	16:17	10	gull	4	
	17:29	1	crow	1	
	18:42	1	black bear	2[1]	
	19:08	4	black bear	2[1]	
	11:01	1	black bear	1	
	11:14	3	black bear	1[2]	15
Nov-04	16:13	5	gull	2	
Nov-05	9:38	6	crow & gull	4+5	
	10:08	1	crow & gull	5+4	
	10:27	2	crow & gull	3+2	10

[1] sow & cub, [2] cub only

Table 11. Scavenger activity at fish carcass sites

Location: Effingham Estuary
Deposit Time & Date: 10:34, October 17, 2009,
Kg deposited 47

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Oct-18	6:16	1	black bear	1	100
	7:45	12	black bear	1	
	8:35	9	black bear	1	90
	20:41	41	black bear	1	
Oct-19	1:54	15	black bear	1	
	4:53	≤ 1	black bear	1	
	5:16	4	black bear	1	
	5:55	2	black bear	1	
	6:03	3	black bear	1	
	6:15	2	black bear	1	
	6:26	4	black bear	1	
	20:20	44	black bear	1	
	21:45	10	black bear	1	80
	22:07	6	black bear	1	
	23:40	1	black bear	1	70
	23:52	4	black bear	1	
Oct-20	0:01	2	black bear	1	
	0:12	2	black bear	1	
	2:48	≤ 1	black bear	1	60
	5:50	28	black bear	1	
	7:22	47	black bear	1	
	11:20	1	gull	2	30
	12:13	≤ 1	gull	1	
	15:08	23	gull	4	
	16:39	1	gull	1	
	16:52	1	gull	1	
	17:24	6	gull	11	
	18:21	21	gull	14	
	18:21	2	crow	1	10

Table 12. Scavenger activity at fish carcass sites

Location: Effingham Estuary
Deposit Time & Date: 17:52, November 1, 2009,
Kg deposited 45

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Nov-02	22:42	1	black bear	1	100
	23:21	1	black bear	1	
Nov-03	4:04	≤1	black bear	1	
	4:43	1	black bear	1	
	5:04	1	black bear	1	
	7:01	1	black bear	1	
	7:14	3	black bear	1	
	8:37	30	black bear	1	
	18:51	15	black bear	1	
	19:08	10	black bear	1	10
	19:35	23	black bear	1	
	20:10	7	black bear	1	
	20:31	34	black bear	1	
	23:24	1	black bear	1	2
Nov-04	1:23	12	black bear	1	
	1:40	3	black bear	1	
	3:13	9	black bear	1	
Nov-05	13:34	1	crow	1	1
Nov-06	0:30	≤1	black bear	1	
	7:46	≤1	black bear	1	
	12:38	≤1	crow	2	
	13:05	≤1	crow	2	
	13:21	≤1	crow	1	
	18:59	2	black bear	1	
Nov-07	9:23	≤1	black bear	1	
	13:23	1	gull	1	
	15:38	1	gull	1	
	15:54	8	gull	3	
	17:34	7	gull	3	
	18:25	1	black bear	1	
	19:21	1	black bear	1	< 1
Nov-08	13:16	1	crow	1	
	13:44	14	crow	7	
	16:10	1	gull	1	
	16:39	5	crow	7	0

Table 13. Scavenger activity at fish carcass sites

Location: Ellingham River
Deposit Time & Date: 12:40, Nov 10, 2009,
Kg deposited 40

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Nov-10	15:50	3	crow	2	100
	15:50	3	gull	2	
	16:12	≤ 1	black bear	1	
	16:37	2	black bear	1	
	16:39	≤ 1	gull	2	
	16:53	≤ 1	gull	3	
	18:51	2	black bear	1	95
Nov-11	0:53	6	black bear	1	
	1:10	1	black bear	1	
	6:29	36	black bear	1	
	4:33	2	black bear	1	
	5:51	7	black bear	1	
	6:23	≤ 1	black bear	1	
	6:50	1	black bear	1	
	7:45	0.5	black bear	1	
	8:57	17	black bear	1	50
	9:19	9	crow	14	
	9:28	2	black bear	1	
	9:44	3	crow	4	
	9:49	≤ 1	black bear	1	
	9:54	≤ 1	black bear	1	
	10:11	1	black bear	1	
	10:18	6	black bear		20
	10:32	≤ 1	Jay	1	
	10:35	4	black bear		
	10:47	10	black bear		
	10:58	4	black bear	2	
	11:06	2	black bear	1	
	11:16	16	black bear	1	10
	11:33	7	crow	9	
	12:11	≤ 1	black bear	1	
	12:36	1	black bear	1	
	13:36	1	black bear	1	
	16:55	≤ 1	black bear	1	5
	17:18	5	black bear	1	
	18:05	4	black bear	1	
Nov-12	0:50	1	black bear	1	1
	1:42	3	black bear	2	
	2:53	1	black bear	3	
	3:20	≤ 1	black bear	4	

Table 13 Continued

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
	3:26	≤ 1	black bear	5	
	5:09	≤ 1	black bear	6	
	6:11	1	black bear	7	
	6:26	1	black bear	8	
	7:02	2	black bear	9	
	8:07	1	black bear	10	
	12:19	1	black bear	1	
	12:21	≤ 1	crow	2	
	12:21	≤ 1	black bear	1	
	12:22	22	crow	25	1
	12:50	1	crow	1	0
	13:12	1	crow	2	0
	17:41	≤ 1	black bear	1	0
	18:24	≤ 1	black bear	1	0
	19:44	1	black bear	1	0
	20:46	≤ 1	black bear	1	0
Nov-13	2:35	≤ 1	black bear	1	0
	4:41	≤ 1	black bear	1	0
	6:55	4	black bear	1	0
	8:50	1	black bear	1	0
	9:57	≤ 1	crow	4	0
	10:30	1	black bear	1	0
	13:01	≤ 1	black bear	1	0
	15:13	1	black bear	1	0
Nov-14	0:11	2	black bear	1	0
	11:03	1	black bear	1	0
	15:43	≤ 1	black bear	1	0
Nov-16	11:42	≤ 1	black bear	1	0
Nov-17	15:48	≤ 1	Jay	2	0
Nov-18	16:07	1	black bear	1	0
	20:35	1	black bear	1	0
Nov-20	14:01	≤ 1	black bear	1	0
	14:16	1	black bear	1	0
Nov-21	11:16	≤ 1	black bear	1	0

10.0 APPENDIX 2

Table 14. Scavenger activity at fish carcass sites

Location: Gil Creek
Deposit Time & Date: 11:00, Aug 29, 2010,
Kg deposited 10 Kg

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Aug-30	8:38	<1	raven	1	100
	10:34	<1	raven	1	
	12:52	22.0		2	
	14:23	4.0		1	
	14:31	3.0	bald eagle	1	
	14:41	1.0	bald eagle	1	
	14:48	<1	bald eagle	1	80
	14:48	1.0	raven	1	
	15:05	1.0	bald eagle	1	
	15:05	2.0	raven	2	
	15:07	16.0	raven	5	60
	16:35	5.0	raven	4	
	17:07	3.0	raven	3	
	18:57	6.0	raven	3	50

Table 15. Scavenger activity at fish carcass sites

Location: Fin Island
Deposit Time & Date: 13:40, Sep 7, 2010,
Kg deposited 9 Kg

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Sep-08	7:46	4	raven	1	100
	7:56	<1	raven	1	
	8:55	<1	raven	1	
	10:41	3	raven	1	
	10:48	2	raven	1	
	13:34	6	raven	1	
	14:09	5	raven	1	
	15:56	2	raven	1	
Sep-09	11:03	<1	raven	1	
	11:07	<1	raven	1	
	13:25	4	raven	1	
	14:05	1	raven	1	0

Table 16. Scavenger activity at fish carcass sites

Location: Chapple Creek
Deposit Time & Date: 15:24, Sep 2, 2011,
Kg deposited 15.5 Kg

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Sep-02	17:26	<1	black bear	1	100
	20:42	<1	black bear	1	
	21:09	1	black bear	1	
Sep-03	6:39	<1	black bear	1	50
	13:04	1	raven	1	
	17:12	<1	black bear	1	
	19:29	1	black bear	1	0
Sep-04	21:04	<1	black bear	1	
Sep-05	21:47	<1	black bear	1	
Sep-06	21:37	<1	black bear	1	
Sep-07	18:50	<1	jay	1	
Sep-10	11:12	<1	black bear	1	
Sep-14	2:30	<1	black bear	1	

Table 17. Scavenger activity at fish carcass sites

Location: Douglas Creek
Deposit Time & Date: 11:03, Sep 3, 2011,
Kg deposited 16 Kg

Date	Feeding bout start time	Bout duration minutes	Species	Maximum number individuals	Percent carcasses remaining
Sep-03	19:09	4	raven	1	100
Sep-05	6:34	1	black bear	1	
	7:00	<1	black bear	1	
	7:10	<1	black bear	1	50
Sep-06	0:35	<1	black bear	1	
	6:21	<1	black bear	1	
Sep-07	3:47	<1	black bear	1	
	6:36	<1	black bear	1	0